

SOUTHWEST FISHERIES SCIENCE CENTER
FOURTH QUARTER REPORT – FY 2005
For the Period of July 1 – September 30

Submitted by: Roger Hewitt, Division Director, Fisheries Resources Division

Title of accomplishment or milestone: Baseline information on the Pacific sardine (*Sardinops sagax*) population off of Oregon and Washington was successfully collected from March 2003 to March 2005.

Current Status: Field work was completed on March 21, 2005, and initial calculations of biomass estimates and spawning characteristics are partially complete. Samples are currently being analyzed for assessment of age/size-specific migration rates, and the acoustic data are being processed.

Background information: After two decades of decline, a moratorium on fishing for sardines was established in 1967, and was in place until 1985. During that time the population steadily increased in abundance. When the fishery started up again in 1985, the data used for sardine assessment models was gathered from the California fisheries in Monterey, San Pedro, and Ensenada. As the population continued to increase in abundance and range, however, the expansion supported a substantial new fishery for sardine in Oregon, Washington, and as far north as British Columbia.

In order to more accurately manage the fishery, a complete data set across the range of the sardine population is needed. Many questions exist with regard to the coast-wide species, however, focusing on the interactions between the northern and southern populations. For example, what percentage of the northern stock is resident, what percentage undergoes annual migration, and what role does either have in the northern fisheries? What is the northern stock structure in terms of age and size and to what extent, if any, does fishery size-selectivity play? The intent of this survey is to generate baseline information regarding the northern population and to begin to answer these and other questions which will help us to understand and better manage this commercially important species.

Purpose of activity: The primary goal is to determine fishery-independent estimates of sardine abundance off of Oregon and Washington, and to estimate the migration rate between central California and Oregon-Washington. The secondary goal is to identify the sardine stock origins taken in all fisheries.

Description of accomplishment and significant results: A total of four surveys were completed off of Oregon and Washington over a two-year period. Two of these were performed during the summers of 2003 and 2004 and two were performed in the winters of 2004 and 2005 (Fig. 1). A total of 214 surface trawls were successfully completed in which 92 were positive for adult or sub-adult sardine. In addition, spawning activity was measured during the two summer surveys using CUFES. Maximum sardine egg densities measured during the summer in

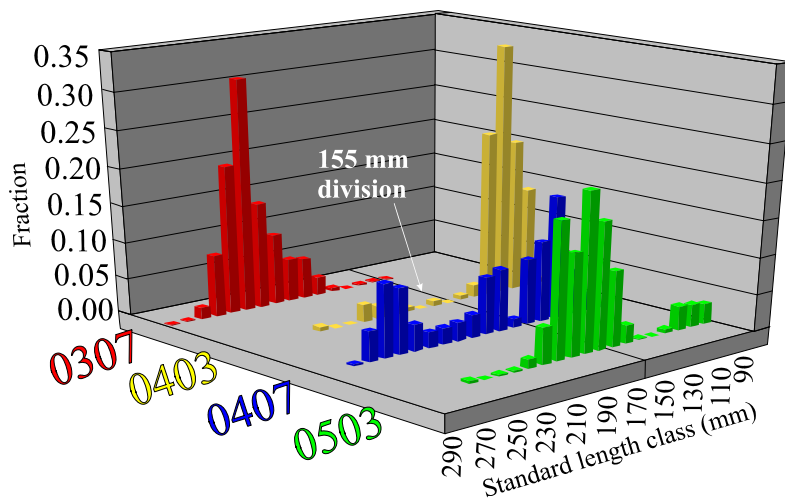


Figure 1. Sardine standard length distribution by 10 mm classes for the trawl random samples in each of the 4 surveys; label indicates midpoint of class and sexes (male, female, and indeterminate) were combined. All sardines below 155 mm (black line) were visually assessed as immature (codes 1) or sex was impossible to determine without a microscope.

the northern distribution (0.85 – 1.144 eggs/minute) were approximately 1% to 2% of the densities seen during April in the southern distribution (40 – 127 eggs/minute). Preliminary results from March 2005 trawl data indicated a sardine biomass in the Pacific Northwest at around 20,000 to 40,000 mt over the survey area of 55,000 nm² (Fig. 2). Initial results of reproductive characteristics indicate that these sardines spawn in the summer months. This was confirmed by the presence of developing embryos in eggs sampled from the surface waters as well as both active female and male adults caught by the surface trawls. In the winter surveys, we observed a very low percentage of positive trawls and almost the complete absence of large sardine such as those seen in the summer surveys.

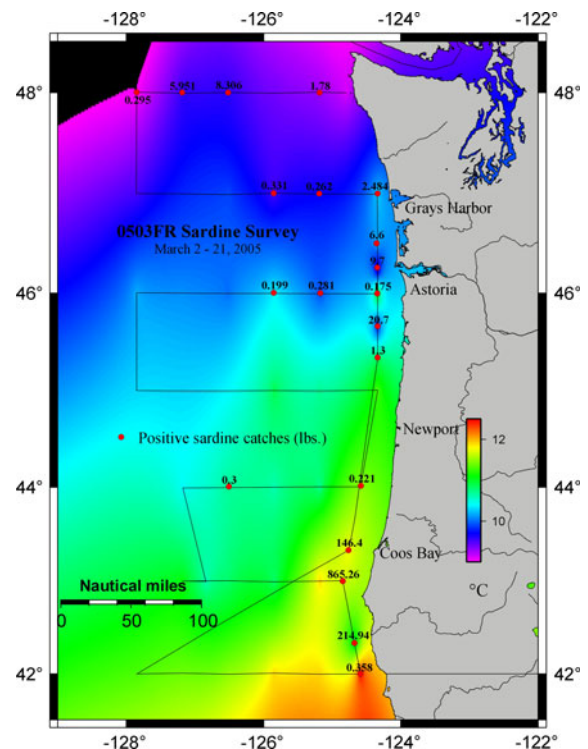


Figure 2. Plot of positive trawls conducted in March of 2005. This survey was the fourth in a series of four cruises conducted over a two-year period. Numbers located above positive tows are representative of the sardine catch in pounds.

Significance of accomplishment: Not only have these preliminary results given us insight into the basic parameters of the sardine population off of Oregon and Washington, but they have also served as an impetus for further studies on a larger scale. The importance of understanding this population as well as its environment will be a key

factor for industry and fisheries management. Although we were unable to continue the survey with a follow-up summer cruise in 2005, plans are underway for a coast-wide, Baja California to British Columbia synoptic survey in April 2006. Hopes are that this will be the first survey in a long time series, possibly within the PaCOOS framework.

Problems: None of the otoliths taken from the four surveys have been processed for age determination due lack of man power, and the algorithm to determine absolute biomass from the acoustic survey has yet to be developed.

Contact: Dave Griffith, 858-546-7155; Nancy Lo, 858-546-7123; Beverly Macewicz, 858-546-7107